COMPARE THE EFFECTIVENESS OF MAITLAND SPINAL MOBILIZATION VERSUS MCKENZIE EXERCISE ALONG WITH CORE STABILITY EXERCISE ON PAIN, RANGE OF MOTION AND FUNCTIONAL ACTIVITIES IN SUBJECTS WITH MECHANICAL LOW BACK PAIN

Dissertation submitted in

Partial fulfillment

For the degree of

MASTER OF PHYSIOTHERAPY

(ORTHOPAEDICS)

The Tamil Nadu Dr.M.G.R Medical University

Chennai

May 2018

PSG COLLEGE OF PHYSIOTHERAPY

Coimbatore

PSG COLLEGE OF PHYSIOTHERAPY

Coimbatore

CERTIFICATE

This is to certify that the research work entitled **"Compare the effectiveness of Maitland Spinal Mobilization versus McKenzie Exercise along with core stability exercise on pain, range of motion and functional activities in subjects with Mechanical Low Back Pain"** was carried out by **Reg. No: 271610244**, P.S.G College of Physiotherapy, towards partial fulfillment of the requirement of the **MASTER OF PHYSIOTHERAPY (Physiotherapy in Orthopaedics)** degree programme of The Tamilnadu Dr. M.G.R Medical University, Chennai.

Internal examiner **External examiner**

Date of evaluation:

PSG COLLEGE OF PHYSIOTHERAPY

Coimbatore

CERTIFICATE

This is to certify that the research work entitled **"Compare the effectiveness of Maitland Spinal Mobilization versus McKenzie Exercise along with core stability exercise on pain, range of motion and functional activities in subjects with Mechanical Low Back Pain."** was carried out by **Reg. No: 271610244**, P.S.G College of Physiotherapy, towards partial fulfillment for the degree of the **MASTER OF PHYSIOTHERAPY (Physiotherapy in Orthopaedics)** under The TamilNadu Dr. MGR Medical University, Chennai.

Prof. R. MAHESH, MPT.,

Principal,

P.S.G. College of Physiotherapy,

Coimbatore - 641 004.

Place: Coimbatore

Date:

PSG COLLEGE OF PHYSIOTHERAPY

Coimbatore

CERTIFICATE

This is to certify that the research work entitled **"Compare the effectiveness of Maitland Spinal Mobilization versus McKenzie Exercise along with core stability exercise on pain, range of motion and functional activities in subjects with Mechanical Low Back Pain."** was carried out by **MANIKANDAN .M** of P.S.G College of Physiotherapy, towards partial fulfillment for the degree of the **MASTER OF PHYSIOTHERAPY (Physiotherapy in Orthopaedics)** under The TamilNadu Dr. MGR Medical University, Chennai. Under my guidance.

GUIDE

Mrs. Y. ASHRAF, MPT,

Associate Professor

P.S.G. College of Physiotherapy,

Coimbatore - 641 004.

Place: Coimbatore

Date:

DEDICATED TO MY EVERLOVING PARENTS AND MY BROTHER

ACKNOWLEDGEMENTS

It is my privilege to express my deep sense of gratitude to the **LORD ALMIGHTY for** showering his blessings, who has always been my source of strength and who guides me throughout.

I dedicate this study to **MY FAMILY, MY BROTHER for** providing their moral support and love in each and every step of my life.

With due respect, I would like to express my immense gratitude to **R.MAHESH, MPT,** Principal PSG College of Physiotherapy, Coimbatore, for his encouragement and inspiration during the course of my study.

I am indebted to **Mrs. Ashraf.Y., MPT** for her expert guidance, valuable ideas, untiring efforts without whom the study would have not been completed.

I will be thankful to my secondary investigator **S.PARTHIBAN** for their kind support during my study.

My special thanks to **Mrs V. Mahalakshmi, MPT**, Post graduate Coordinator, PSG College of physiotherapy who has moulded me in my academics activities and made my project completion easier.

I will be thankful to my teachers **Mr.K.Saravanan, Mr.B.Nagaraj, Mr.J.Rajaregan, Mr.M.Mahendiran, Ms.P.Shanmugapriya, Mrs.P.Sweetysubha, Mrs.S.Malarvizhi** for their kind support during my study.

My special thanks to **Dr. N. RAMKUMAR, MBA., Ph.D, Assistant Professor**, Faculty of Human Resource, PSG Institute of management, Coimbatore for his guidance in research and statistical method of data analysis.

My special thanks to **Dr. ANIL MATHEW Ph.D, Professor,** Department of Biostatistics, PSG Institute of Medical Science and Research who gave me a helping hand in statistical method of data analysis.

I thank all the member of **Institutional Human Ethics Committee** of PSG Institute of Medical Science and Research for their recommendation and summation for ethical clearance and values kind suggestions to complete the dissertation.

And also, I thank to **My Friends, Colleagues**,**Seniors and Juniors** for sharing their knowledge, love, support and exclusive cooperation.

Finally, it would not be meaningful and complete if I fail to mention those who were so co-operative and lovable during the entire course of the study, ***specially I extend sincere gratitude and special thanks to all my beloved patients.***

ABBERVIATIONS

LBP	-	Low Back Pain
MLBP	-	Mechanical Low Back Pain
ROM	-	Range Of Motion
ODI	-	Oswestry Disability Index

CONTENTS

LIST OF ANNEXURES

CHAPTER I

INTRODUCTION

1.1. BACKGROUND OF THE STUDY

MECHANICAL LOW BACK PAIN

Low back pain (LBP) is the leading cause of worldwide disability and it occurs in similar proportions in all cultures, interferes with quality of life and work performance and is the most common reason for medical consultations[(1)].

Low back pain is defined as any "Non-traumatic musculoskeletal disorder affecting the low back. It includes all back pain, regardless of diagnosis, that was not secondary to another (or) injury. Eg. Cancer or motor vehicle accident [(2)].In patients with low back pain, the terms non- specific (or) mechanical back pain are used to describe an entity whose pathoanatomical etiology in unknown[(3,4,5)].

Mechanical LBP is characterized by increased pain with motion and decreased pain with rest where the pain of non-mechanical LBP generally occurs at rest and in less affected by motion [(6)].

Worldwide 37% of LBP was at attributed to occupation with two-fold variation across regions. The attributable proportion was higher for men than women, because of higher in participation in occupation with heavy lifting (or) whole body vibration LBP is described by the length of time symptoms persist as.

- Acute LBP lasts less than 6 weeks
- Sub-acute LBP lasts between 6 &12 weeks
- Chronic LBP persist for >12 week

IT CAN BE DIVIDED INTO 2 CATEGORIES

- Mechanical low back pain
- Neurogenic low back pain

NEUROGENIC LOW BACK PAIN

Compressive or neurogenic low back pain caused by irritation or pinching of the nerve root. A disc or bony spur can compress the nerve root.

MECHANICAL LOW BACK PAIN

Inflammation of the facet joint, discs, ligaments or muscles of the low back cause mechanical low back pain. This is a result of strain, overuse or trauma

MECHANICAL LOW BACK PAIN CLINICAL FEATURES

- Pain is usually cyclic
- Low back pain is often referred to the buttocks and thighs
- Morning stiffness or pain is common
- Start pain (when starting movement) is common
- There is pain on forward flexion and often also on returning to the erect position.
- Pain is often produced or aggravating by extension side flexion, rotation, standing walking sitting and exercise in general
- Pain usually become worse over the course of the day
- Pain is relieved by change of position
- Pain is relieved by lying down, especially in the fetal position [(8)].

ANATOMY

VERTEBRAE:

- The spine is a column of small bones or vertebrae that support the entire upper body. The column is grouped as follows,
- The cervical (C) vertebrae are the seven spinal bones that support the neck.
- The thoracic (T) vertebrae are the twelve spinal bones that connect to the rib cage
- The lumbar (L) vertebrae are the five lowest and largest bones of the spinal column and most of the body's weight and stress fall on the lumbar vertebrae

- Below the end of sacrum a shield shaped bony structure that connects with pelvis and sacroiliac joints.
- At the end of the sacrum is two to four tiny, partially fused vertebrae known as the coccyx or tail bone.

THE DISC:

Vertebrae in the spinal column are separated from each other by cartilage known as intervertebral discs. Inside each disc is a jelly like substance called the nucleus pulpous, which is surrounded by a tough fibrous shell called the annulus. The disc is 80% water and has no blood supply of their own but rely on nearby blood vessels to keep them nourished.

PROCESSES:

Each vertebra in the spine has a number of bony projections known as processes.

SPINAL CANAL:

Each vertebra and its processes surround and protect an arch-central opening which enclosed the spinal cord.

SPINAL CORD:

Spinal cord is central trunk of nerves that connect the brain with rest of the body. When it reaches the lumbar region, it splits in four bundled strands of nerve root called the ‘cauda equine’ (meaning ‘horse tail’ in Latin)

A.LUMBAR VERTEBRA:

Each lumbar vertebra may be divided into 3 sets of functional elements,

- Anterior elements, consisting of the vertebral body
- Middle elements, consisting of pedicles,
- Posterior elements, consisting of laminae, articular processes, spinous process, transverse processes, mammillary processes and accessory processes.

- Anterior elements or vertebral bodies sustain the compression loads applied to the vertebral column, including the compression loads impacted by contraction of back of muscles.
- The posterior elements regulate the passive and active forces applied to the vertebral column.
- The articular processes provide a locking mechanism the resists forward sliding and twisting of the vertebral body.
- The spinous process, transverse processes, mamillary processes and accessory processes provide area of muscle attachments and constitute levers that enhance the action of the attached muscles.
- The laminae transmits the forces from spinous processes and inferior articular processes to the pedicles, thus they are susceptible to injuries such as pars inter-articularis.
- The pedicles, which are the only connection between the anterior and posterior elements, transfer the controlling forces from the anterior to the posterior elements.

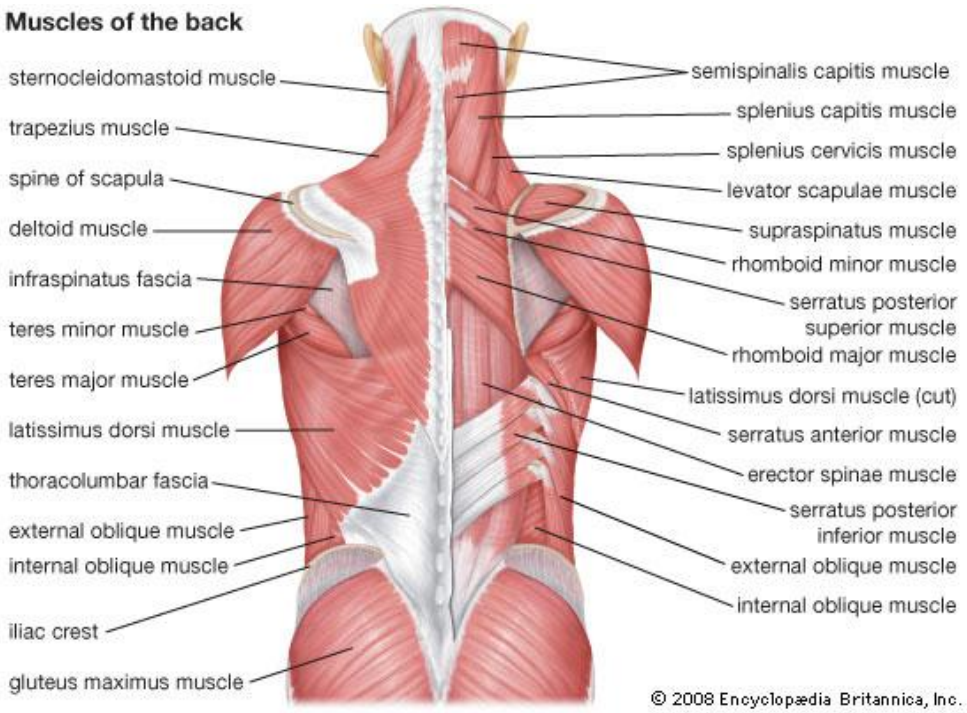
B. JOINTS:

- When any 2-consecutive lumbar vertebra are articulated, they from a three- joint complex called the motion segment,
- The principle joint between the vertebral bodies is formed by intervertebral disc. The other two joints are formed the articulation of the superior articular processes of one vertebra with the inferior articular processes of the vertebra above known as the zygopophyseal joints.

C.MUSCLES:

On anatomic and functional grounds, the paravertebral musculature of lumbar spine may be divided into three groups.

- Psoas major and psoas minor
- Quadratus lumborum and intertransversari laterals
- Lumbar back muscles



1.2 NEED OF THE STUDY:

Mechanical low back pain is a syndrome in which localized aching pain exacabated by the motions, turns lifts and prolonged standing or sitting. 85% of people affected by the mechanical low back pain.

MLBP reaches 70% of the population in industrialized countries. The range of 45 years in the most common reason for missing work and in the most prevalent among musculoskeletal disease. The people are affected in socially and economically in day to day activities.

Therefore the Maitland spinal mobilization technique exercise and McKenzie exercise with core stability exercise are effective on reducing pain improving range of motion and functional activities in subjects with mechanical low back pain

1.3 AIM OF THE STUDY:

The aim of the study was to find out the effects of Maitland Spinal Mobilization versus McKenzie Exercise along with core stability exercise on pain, range of motion and functional activities in subjects with Mechanical Low Back Pain.

1.4 OBJECTIVES OF THE STUDY:

- To find out the effects of Maitland Spinal Mobilization with core stability exercise on pain, range of motion and functional activities in subjects with Mechanical Low Back Pain.
- To find out the effects of McKenzie Exercise with core stability exercise on pain, range of motion and functional activities in subjects with Mechanical Low Back Pain.
- To compare the effects of Maitland Spinal Mobilization versus McKenzie Exercise along with core stability exercise on pain, range of motion and functional activities in subjects with Mechanical Low Back Pain.

1.5 HYPOTHESIS:

NULL HYPOTHESIS (Ho)

There will be no significant difference between the effects of Maitland Spinal Mobilization versus McKenzie Exercise along with core stability exercise on pain, range of motion and functional activities in subjects with Mechanical Low Back Pain.

ALTERNATIVE HYPOTHESIS (Ha)

There will be significant difference between the effects of Maitland Spinal Mobilization versus McKenzie Exercise along with core stability exercise on pain, range of motion and functional activities in subjects with Mechanical Low Back Pain.

1.6. OPERATIONAL DEFINITIONS

LOW BACK PAIN

Low back is a common muscular disorder that may either acute or chronic. It may be caused by a variety of dysfunction or disorder that affecting the lumbar spine.

(DR. JOSEPH. F. SMITH)

MECHANICAL LOW BACK PAIN

Inflammation of facet joint and disc, ligaments, muscle of the low back causes mechanical low back pain. This is the result of strain, overuse or trauma.

(DR. JOSEPH. F. SMITH)

PAIN

An unpleasant sensory and emotional experience associated with actual or potential tissue damage. **(IASP 2004)**

RANGE OF MOTION

Range of motion is the measurement of movements around a specific joint or body parts Anatomical position to extreme limited of the motion. (**ERIN MCLAUGHLIN)**

FUNCTIONAL ACTIVITIES

Activities are required to perform the functional activities included working setting of daily living. **(NUGENT. PAM M.S-2013)**

MAITLAND MOBILIZATION TECHNNIQUE

It is a passive, skilled manual therapy technique applied to the joints and related soft tissues at varying speed and amplitudes using physiological or accessory motions for therapeutic purposes. **(GEOFFERY D. MAITLAND 1950)**

MCKENZIE EXERCISES

It is the extending the spine could provide significant pain relief to certain patients and allow them to return to their normal daily activities. **(ROBIN MCKENZIE 1931)**

CHAPTER II

LITERATURE REVIEW

Rafiq Ahmed, et al., 2014. They study was conducted with of 40 subjects including both genders. Two groups experimental group SLM technique with cores stability exercise control group core stability exercise. Study duration was 6 weeks. All the subjects were measured by VAS AND ODI. They conducted an experimental study mechanical low back pain will show more improvement in pain and function while treated by specific lumber mobilization and core stability exercise as compared to those patients who will treated by specific joint mobilization techniques[(11)].

Abhijit Dutta, et al., 2015 in this study had 30 subjects including both gender age group of 20-50 years old. Study duration was 4 weeks. All the subjects were measured for ODI and dynamic endurance tests. They concluded that core stabilization exercise proved to be more effective than McKenzie exercise in reducing pain and increasing the endurance level in the treatment of patients with mechanical low back pain [(12)].

SairaWaqqaret, al., 2016. In this study was consisting of 37 subjects including both gender age group of 30-70 years old. Group A 20 experimental group- Mulligan SNAGs Group B 17 McKenzie EEP. Study duration was 4 weeks. All the subjects were measured VAS, ODI and lumbar range of motion.They conducted an experimental study McKenzie extension exercises EEP is clinically slightly more effective in the management of pain and disability as compared with Mulligan SNAGs, while effective in improvement lumbar ROM as compared with McKenzie EEP in the management CMLB

Suresh Babu Reddy, et al., 2015 in this study had 40 subjects age groups 20-50 years old including both gender. Study duration was 6 weeks. All the subjects were measured by VAS and Rolland Morris disability questionnaire and lumbar range of motion using goniometer. They conducted an experimental study after the treatment sessions core stabilization group registered a significant improvement when compared to conventional back care exercise in improving function and reliving pain[(13)].

Karina Yuko Abeet, al., 2015 in this study had 60 subjects including gender women age groups 22-33 years old. Study duration was 7days. All the subjects were measured by VAS and muscle strength. They conducted an non experimental study lumbar PA Mobilization was effective for increasing muscular strength and endurance, with stabilization of the level of pain, flexibility and mobility [(14)].

Apeksha O Yadav, et.al., 2013 in this study had 30 subjects with mechanical low back pain were selected and core muscle stability training was given. Outcome measures were recorded pre-andpost-training program using STAR excursion test. They conducted an experimental study was core stabilization training is significantly effective in improving dynamic balance in mechanical low back pain patients[(10)].

Christopher M. Powers, et al., in this study the effect of PA mobilization and a press-up exercise were examined in people with non specific low back pain. First group received spinal PA mobilization, second group performed press-up exercise pain intensity and vertebral angle measured with dynamic MRI .Both measures were taken before and immediately after a single-session of mobilization or press-ups. Lumbar extension improved in both groups there was a slightly greater amount of movement improvement in the mobilization group. However, one treatment was not more effective than the other in achieving overall pain relief or increasing motion in people with non specific low back pain.

Aditchiradejnant et al., in this study a randomized trial of 120 subjects suffering low back pain. One group received symptomatic treatment at the respective level. Other group received treatment randomly in the lumbar level. Both groups were randomly given denominated treatment grade.The study confirmed that posteroanterior mobilization treatment given to the respective level had immediate analgesia effect on low back pain[(28).]

Nwuga et al in this study had one group consists of 25 females received conventional physical therapy. Other group consists of 26 females who received spinal manipulation therapy. The conducted a comparative study on relative therapeutic efficacy of vertebral manipulation and conventional therapy in patient with back pain the results of the study showed significant difference between the two groups. The study was concluded that manipulation therapy was superior to the conventional therapy.[(29)]

CHAPTER III

METHODOLOGY

3.1. STUDY DESIGN

A Prospective, open labelled, quasi-experimental comparative design

3.2. STUDY SETTING

Department of Orthopaedics& Department of Physical Medicine and Rehabilitation, PSG Hospitals, Coimbatore.

3.3. SAMPLING METHOD

Simple random sampling method

3.4. SELECTION CRITERIA

Inclusion Criteria

- The age group of subjects within 20-45 years
- Both male and female
- Straight leg raising test- 1,2,3,4,5- Negative
- Slump test 1,2,3- Negative
- Centralized pain
- Who will consent to participate in the study

Exclusion Criteria

- Lumbar spondylosis
- Spinal canal stenosis
- Ankylosing spondylitis
- Spondylolisthesis
- Spinal fracture
- Spinal tumors

- Infective spinal condition
- Pregnancy
- Who had the same treatment technique priorly

3.5. STUDY DURATION

The period of study was 7 months

3.6. STUDY MATERIALS

- Goniometer (universal)
- Inch tape
- Knee hammer
- Hot pack
- Treatment couch, Bed sheet, Pillows, Assessment chart, Pen, Timer

3.7. TREATMENT DURATION

2 Sets 10 Repetitions, 3 session/ week for 2 weeks

3.8. OUTCOMES MEASURES

- Lumbar Range of motion (Schober test)
- Numerical pain rating scale (NPRS)
- Oswestry Disability Index (ODI)

3.9. PARTICIPANTS

40 subjects with mechanical low back pain were recruited from the Orthopaedic department and PMR department. 28 Subjects were included according to inclusion criteria and were randomly allocated into 2 groups by simple random sampling method.

3.10. INTERVENTION

- **GROUP A- 14 Subjects –**Received Maitland Spinal Mobilization Technique & Core Stability Exercises for 2 Sets 10 Repetitions, 3 session/ week for 2 weeks
- **GROUP B- 14 Subjects –** Received McKenzie Exercise & Core Stability Exercises for 2 Sets 10 Repetitions, 3 session/ week for 2 weeks

CHAPTER-IV

STATISTICAL ANALYSIS AND INTERPRETATION

The Mean, Standard deviation and Paired-t" test, Independent-t" test values were used to find out any significant difference between the two groups (Group A & B)

Data collected from Group A (Maitland Spinal Mobilization) and Group B (McKenzie Exercise) were analyzed. By using paired "t" test to measure the changes between the pre and post-test values within the group and independent–t test was done to measure the changes between group analysis. All these statistical analysis were performed through **SPSS-20** Version.

Paired 't' test:

$$SD = \sqrt{\frac{\sum (d - \overline{d})^2}{n-1}}$$

$$t = \frac{\overline{d}\sqrt{n}}{SD}$$

$\overline{d}$ = Calculated Mean Difference of pretest and posttest values

SD = Standard Deviation

n = Number of samples

d = Difference between pretest and posttest values

Independent 't' test:

$$t = \frac{|\bar{x}_1 - \bar{x}_2|}{SD\sqrt{\frac{1}{n_1} + \frac{1}{n_2}}}$$

Where,

$$SD = \sqrt{\frac{(n_1 - 1)SD_1^2 + (n_2 - 1)SD_2^2}{(n_1 + n_2) - 2}}$$

$\overline{X_1}$ = Mean difference in Group A

$\overline{X_2}$ = Mean difference in Group B

SD = Combined standard deviation of Group A and Group B

n_1 = Number of patients in Group A

n_2 = Number of patients in Group B

SD_1 = Standard Deviation of Group A

SD_2 = Standard Deviation of Group B

TABLE: 1

P. NO	GROUP A –MAITLAND SPINAL MOBILIZATION TECHNIQUE DATA VALUES							
	PAIN		RANGE OF MOTION (cm)				ODI (%)	
			FLEXION		EXT			
	PRE	POST	PRE	POST	PRE	POST	PRE	POST
1	8	3	2	4	1	3	44	28
2	7	2	3	5	1	3	36	20
3	6	2	2	5	1	3	34	16
4	7	2	3	6	2	3	38	14
5	7	3	3	6	1	3	36	14
6	7	3	3	5	2	4	34	12
7	7	3	2	5	1	3	38	12
8	9	2	2	6	1	3	62	24
9	8	3	2	5	2	3	46	14
10	8	2	3	6	1	2	48	14
11	8	2	3	7	2	3	46	12
12	8	2	3	6	2	3	48	22
13	8	3	3	5	2	3	56	16
14	8	3	2	5	1	3	56	22

TABLE: 2

MAITLAND SPINAL MOBILIZATION TECHNIQUE

PRE AND POST TEST VALUES OF PAIN

(GROUP A)

OUTCOME	ANALYSIS	Mean	Mean difference	Standard Deviation	t value	p value
PAIN	PRE	7.571	2.85	0.916	20.696	0.001
	POST	2.5				

TABLE: 3

MAITLAND SPINAL MOBILIZATION TECHNIQUE

PRE-AND POST TEST VALUES OF RANGE OF MOTION

(GROUP A)

OUTCOME RANGE OF MOTION(ROM)	ANALYSIS	Mean	Mean difference	Standard Deviation	t value	p value
LUMBAR FLEXION	PRE	2.51	2.857	0.662	16.125	0.001
	POST	5.428				
LUMBAR EXTENSION	PRE	1.428	1.571	0.513	11.449	0.001
	POST	3.0				

TABLE: 4

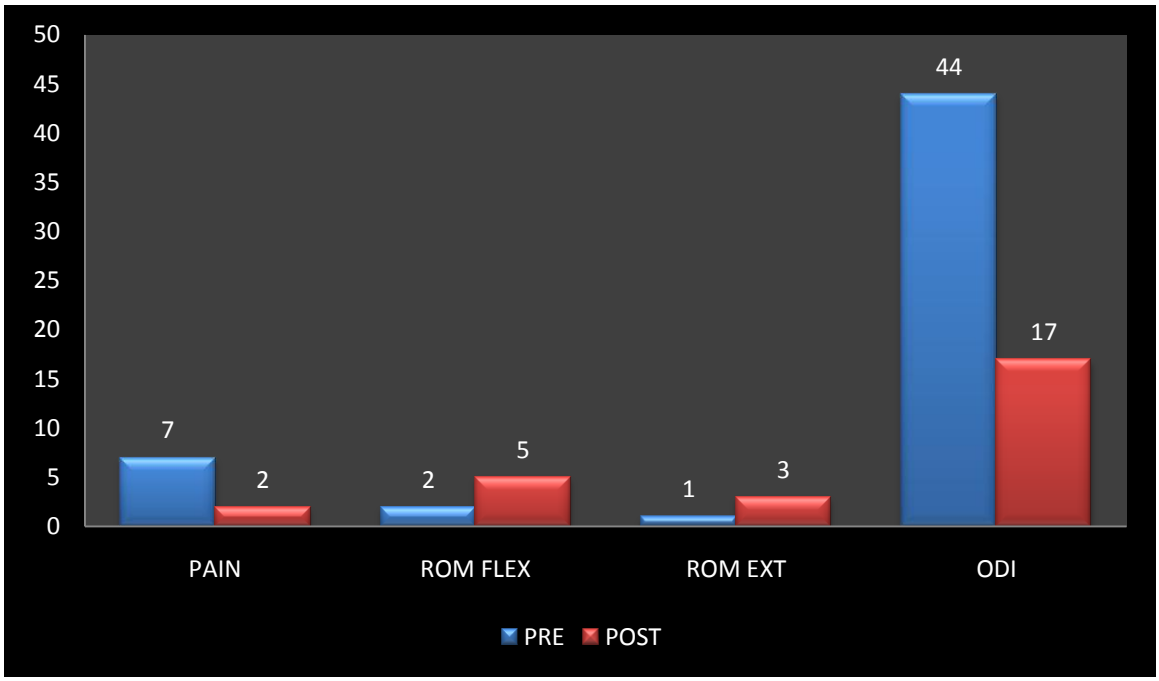
MAITLAND SPINAL MOBILIZATION TECHNIQUE

PRE AND POST TEST VALUES OF FUNCTIONAL ACTIVITIES

(GROUP-A)

OUTCOME	ANALYSIS	Mean	Mean difference	Standard deviation	t value	p value
Oswestry Disability Index (ODI)	PRE	44.428	27.285	8.061	12.664	0.001
	POST	17.142				

GRAPH: 1



Graphical presentation of Maitland Spinal Mobilization Technique (Group A) within group analysis on pain range of motion & functional activities

TABLE: 5

P. NO	GROUP B- MCKENZIE EXERCISES DATA VALUES							
	PAIN		RANGE OF MOTION (cm)				ODI (%)	
			FLEXION		EXT			
	PRE	POST	PRE	POST	PRE	POST	PRE	POST
1	8	3	1	5	1	3	30	12
2	4	3	1	4	2	4	34	12
3	8	2	2	5	2	4	40	10
4	8	3	4	5	1	3	30	14
5	8	3	2	4	3	4	42	14
6	7	3	2	5	3	4	38	14
7	9	2	3	6	2	4	36	12
8	7	2	1	5	1	3	46	28
9	8	3	2	6	2	3	46	20
10	7	2	3	5	1	3	46	16
11	7	3	3	6	1	3	42	14
12	8	2	3	6	2	4	50	16
13	7	2	1	6	1	3	54	20
14	9	5	3	6	2	3	48	16

TABLE: 6

MCKENZIE EXERCISE

PRE-AND POST TEST VALUES OF PAIN

(GROUP –B)

OUTCOME	ANALYSIS	Mean	Mean difference	Standard deviation	t value	p value
PAIN	PRE	7.50	4.785	1.368	13.082	0.001
	POST	2.714				

TABLE: 7

MCKENZIE EXERCISE PRE-AND POST TEST VALUES OF RANGE OF MOTION

(GROUP- B)

OUTCOME RANGE OF MOTION	ANALYSIS	Mean	Mean difference	Standard deviation	t value	p value
LUMBAR FLEXION	PRE	2.214	3.071	0.997	11.524	0.001
	POST	5.285				
LUMBAR EXTENSION	PRE	1.714	1.714	0.468	13.682	0.001
	POST	3.428				

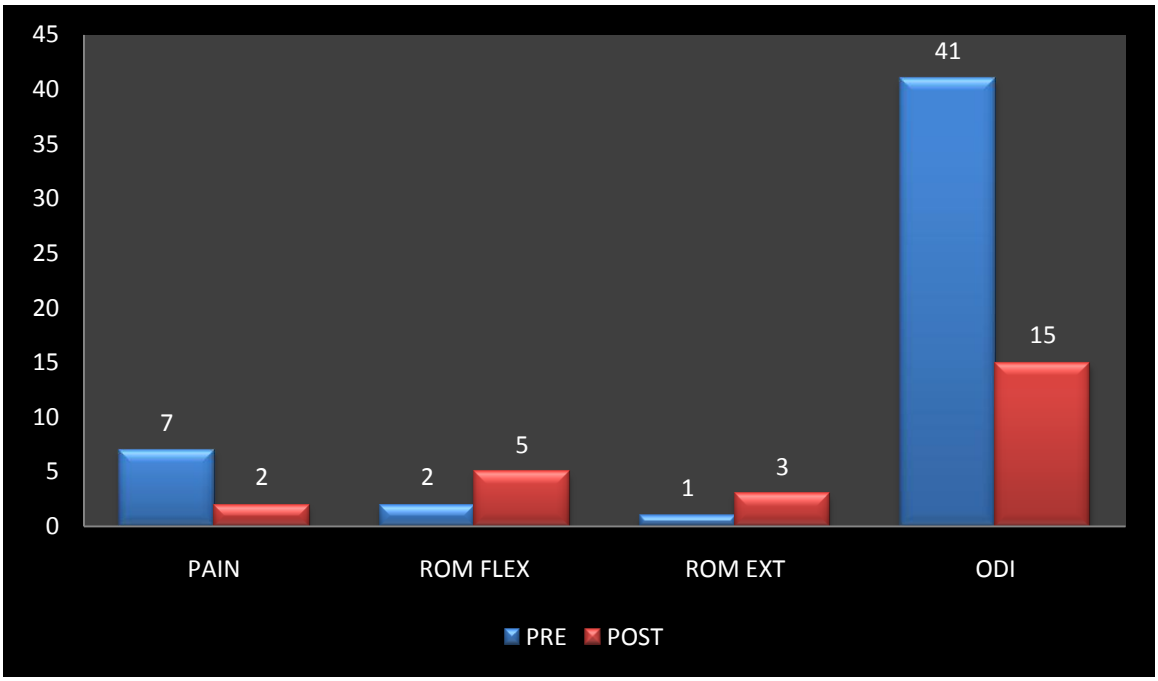
TABLE: 8

MCKENZIE EXERCISEPRE AND POST TEST VALUES OF FUNCTIONAL ACTIVITIES

(GROUP-B)

OUTCOME	ANALYSIS	Mean	Mean difference	Standard deviation	t value	p value
Oswestry Disability Index (ODI)	PRE	41.571	26.00	5.922	16.426	0.001
	POST	15.571				

GRAPH: 2



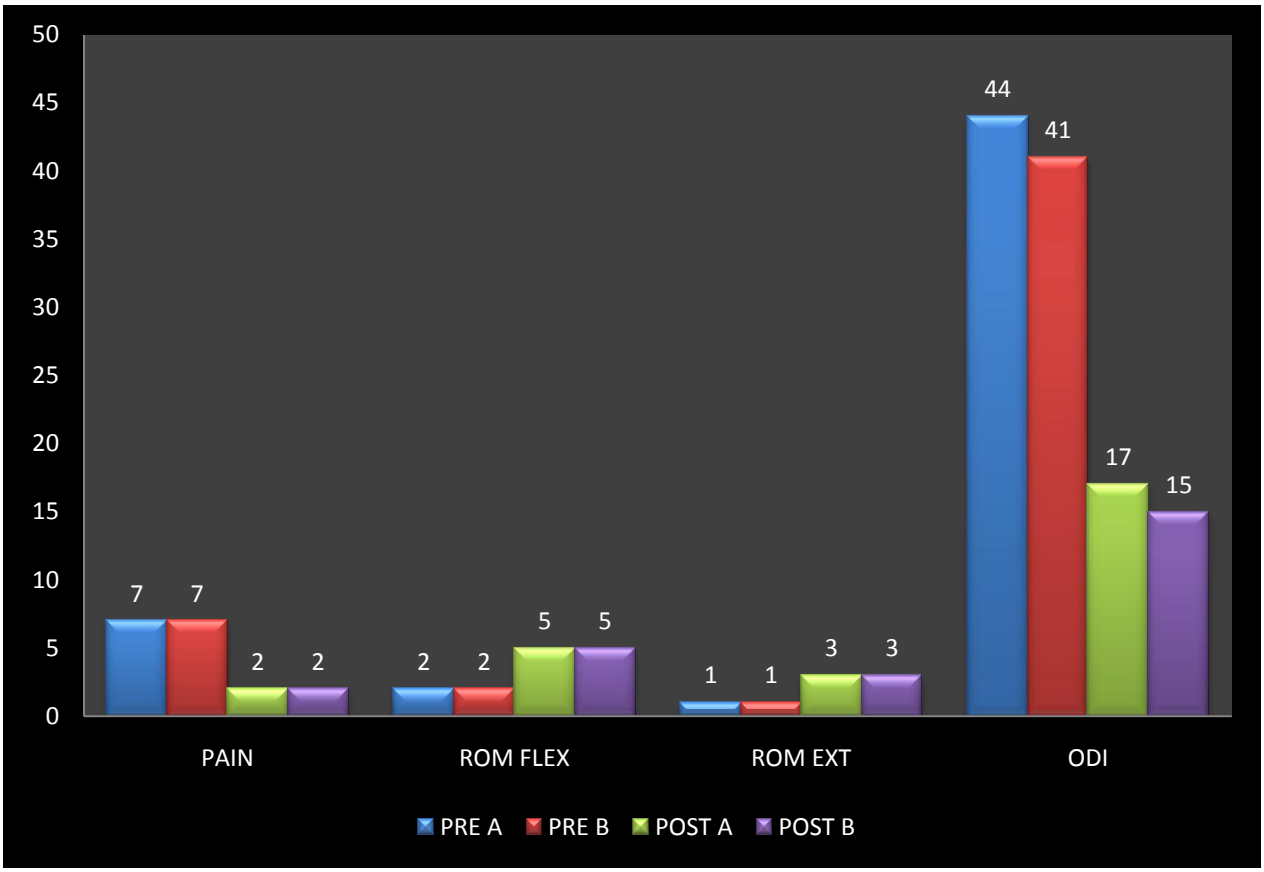
Graphical presentation of McKenzie exercise (Group B) within group analysis on pain range of motion & functional activities

TABLE: 9

PRE AND POST TEST VALUES OF MAITLAND SPINAL MOBILIZATION TECHNIQUE AND MCKENZIE EXERCISE BETWEEN GROUP ANALYSIS

OUTCOMES	ANALYSIS	GROUP	MEAN	t VALUE	p VALUE
PAIN	PRE	A	7.571	0.186	0.854
	PRE	B	7.50		
	POST	A	2.5	0.822	0.420
	POST	B	2.714		
LUMBAR FLEXION	PRE	A	2.51	1.213	0.240
	PRE	B	2.214		
	POST	A	5.428	0.883	0.614
	POST	B	5.285		
LUMBAR EXTENSION	PRE	A	1.428	1.214	0.240
	PRE	B	1.714		
	POST	A	3	0.002	0.020
	POST	B	3.428		
ODI	PRE	A	44.428	0.922	0.365
	PRE	B	41.571		
	POST	A	17.142	0.855	0.401
	POST	B	15.571		

GRAPH: 3



Graphical Representation on Comparison of Maitland Spinal Mobilization Technique and McKenzie exercise on pain range of motion functional activities between group analysis

INTERPRATATION

The Group A (Maitland Spinal Mobilization) for the Pain Pre and Post test mean value 7.571and 2.5‘t’ value is 20.696 (p< 0.001). Range of Motion-lumbar flexion the Pre and Post-test mean value 2.51and 5.428,‘t’ value is 16.125 (p< 0.001) .Range of Motion-lumbar extension the Pre and Post test mean value 1.428and 3,‘t’ value -11.449 (P<0 0.001) For ODI Pre and Post-test mean value 44.428 and 17.142‘t’ value is 12.664 (P<0 0.001).

The result shows that Maitland Spinal Mobilization is an effective technique on reducing pain, improving ROM and functional activities among mechanical low back pain patients.

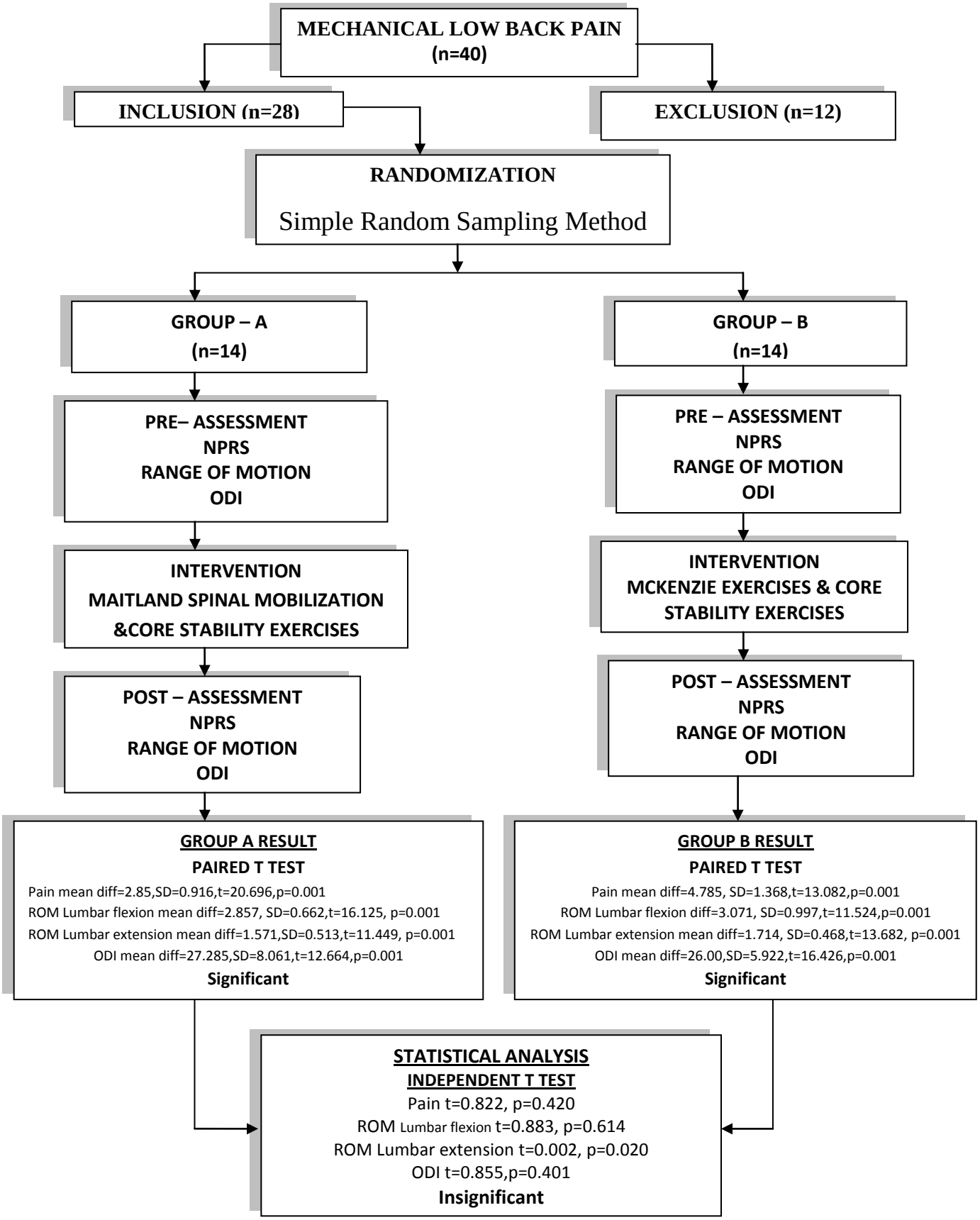
The Group B McKenzie exercise for the Pain Pre and Post test mean value 7.50and 2.714, ‘t’ values is 13.082 (p 0.001). Range of Motion- lumbar flexion Pre and Post test mean value 2.214 and 5.285,‘t’ value is 11.524 (p<0.001). Range of Motion- lumbar extension Pre and Post test mean value 1.714 and 3.428,‘ t’ value is 13.682(p< 0.001). For ODI Pre and Post-test mean value 41.571 and 15.571,‘t’ values is 16.426 and (p<0.001)

The result shows that McKenzie exercise is an effective technique on reducing pain, improving ROM and functional activities among mechanical low back pain patients.

Group A and B Pain Post-test mean value 2.5and 2.714 the‘t’ value is 0.883 (p>0.001) Group A and B Range of motion lumbar flexion post-test mean value 5.428 and 5.285, the ‘t values is 0.883 (p>0.001) Group A and B Range of motion lumbar extension post-test mean value 3and 3.428 the ‘t’ test values is 0.002 (p>0.001).Group A and B ODI Post-test mean value 17.142and 15.571, the ‘t’ value is 0.855 (p>0.001).

The pre and post test results of Group A and Group B shows that there is a statistical and clinical significant effect of each therapy on reducing pain, improving ROM, and functional activities among mechanical low back pain patients.

FLOW CHART OF THE STUDY



CHAPTER V

DISCUSSION

Rafiqahmed 2014 done study on physical therapy treatment of mechanical low back pain. They concluded that a study analysis of the results of the study show more improvement in pain and functional activity. While treated by specific lumbar mobilization and core stability exercise as compared to those patients who will be treated by specific lumbar mobilization techniques

In my quasi experimental study among 40 subjects, 12 was excluded the remaining 28 subjects were aged 20-45 years .it was a simple random sampling method of study design. Two groups were selected with each 14 subjects. Group A intervention was

Maitland Spinal Mobilization technique and the other group B received McKenzie exercise with core stability exercise and both the groups were effective treatment for mechanical low back pain in relieving pain improving lumbar range of motion(flexion and extension) but when comparing between the groups , Group A Maitland Spinal Mobilization and Group B McKenzie Exercise proved to be effective in bring changes in Range of Motion of lumbar extension but was ineffective in bringing changes in pain, range of Motion of lumbar flexion and Functional Activities.

Abhijit Dutta2015 this study concluded that core stabilization exercise possessed a greater potential over the effective McKenzie exercise in reducing pain and increasing the endurance level in the treatment of patients with mechanical low back pain. This is because spinal stabilization was more effective for low back patients and in further analysis the before treatment mean score of Revised ODI for core stabilization exercise was reduced, at the end of second week of treatment and which got further decreased in the end of the fourth week when compared to Group II as their base line mean score of Revised ODI was decreased, at the end of second week of treatment and it further decreased in the end of the treatment. Thus, statistically there is a significant difference between both the groups and Group-I (Core Stabilization Exercise) is more effective than Group-II (McKenzie exercise) in Revised ODI.

In my study the effects of Maitland Spinal Mobilization versus McKenzie Exercise with core stability exercise on pain, range of motion and functional activities in subjects with Mechanical Low Back Pain.. The study concludes that Group A Maitland Spinal Mobilization and Group B McKenzie Exercise show significant changes in Pain, Range of Motion of lumbar flexion, extension and Functional Activities. But when both groups were compared, Group A Maitland Spinal Mobilization and Group B (McKenzie Exercise) proved to be effective in bring changes in Range of Motion of lumbar extension and also ineffective in bring changes in Range of Motion of lumbar flexion and Functional Activities but there are changes in the ODI which has been statistically improved in group A comparing group B.

CHAPTER VI

SUMMARY AND CONCLUSION

SUMMARY:

The aim of the study was to assess the changes occurring in the musculoskeletal system after Maitland Spinal Mobilization and McKenzie Exercise with Core Stability Exercise in Mechanical Low Back Pain subjects.

A total number of 28 subjects were selected by Random sampling method after considering the inclusion and exclusion criteria. The informed contents were obtained from subjects individually.

Pain, Range of Motion and Oswestry Disability Index (ODI) were taken as the parameters to measure. Pre-test and post-test value of Group A and Group B where obtained and compared by using paired‘t’ test and independent ‘t’.

CONCLUSION:

Maitland Spinal Mobilization Group A and McKenzie exercise Group B both are effective in the treatment of Mechanical Low Back Pain (MLBP). These techniques showed clinical and statistical significant effectiveness on these parameters.

The study is intended to compare the effectiveness between Maitland spinal mobilization technique and McKenzie exercise in the treatment of patient with mechanical low back pain (MLBP). The result of the scores shows that is a pain reduction in both groups, improvement of ranges of motion both lumbar flexion and extension. There is an improvement in the functional activities of patients in both groups.

It shows that there is a clinical significant improvement of patients complaints in both groups. But the statistical inference shows that there is no significant difference between both groups. That is both treatments gave equal effectiveness among the outcome measure of mechanical low back pain patients.

CHAPTER VII

LIMITATIONS AND RECOMMENDATIONS

- This study was done on subjects with age groups 20- 45 years old. Can be planned for in other age group also.
- This study was planned for the PG curriculum, planned for 7 months. The future study can be expanded to under duration and can collect more samples to find out the effectiveness. May be increasing the samples may show the exact effectiveness of each technique in a better way.
- According to the inclusion criteria with in this short duration of 7 months got 28 patients totally. If we extend the study duration we might have more samples.
- The prevalence rate was not find in this study. We can also included this along with other demographic descriptive analysis.
- In this study the intervention duration planned was 2 weeks as per the literature reviews. This can be increased to find out the maximum effect.

REFERENCES

1. Ehrlich GE. Low Back pain. Bull world health organ 2003 Nov; 81(9):671-6
2. Punnett L et al. Estimating the global burden of low back pain attributable to combined occupational exposures. (American journal of industrial medicine.2005)
3. AHCPR (Agency for health care policy and research) 1994 acute low back pain problems in adults. Bigoss, Bowyer o, Brean GR et al (Eds); department of health and human services, USA.
4. CSAG.(Clinical standard advisory group) 1994.back pain. London
5. Deyo RA Diagnostic evaluation of LBP. Reaching a specific diagnosis in often impossible. Archives of internal medicine.2002;162.1444-1448
6. Deyo RA, Rainvile J, Kent DL. What can the history and physical examination tell us about low back pain. JAMA 1992;268;760-5
7. Kuritzky L. Barnett A ,Doan H, et al .The 10-minutes examination for low back pain. J Musculoskeletal Med.(2002;19:1497-505)
8. David J Magee, Orthopaedic Physical assessment .Edition-
9. Bratton RL Assessment and management of acute low back pain Am Fam physician, 1999; 6.2299-308.
10. Apekesh O Yadavet. al. effectiveness of core muscle stabilization training on dynamic balance in mechanical low back pain patients. Indian journal of physiotherapy and occupational therapy 2013 volume 7, No 3.
11. Rafiqahmedet,al., comparison between specific lumbar mobilization and core stability exercise with core stability exercise alone in mechanical low back pain. Pak J Med Sci 2014;30(1):157-160.
12. AbhijitDutta et.al., A comparative study to find out the effectiveness between core stabilization exercise versus McKenzie exercise in the treatment of patients with mechanical low back pain
    Indian journal of physiotherapy.2015 volume 2, (5) 791-797

13. Suresh babu et al effects of core stabilization program and conventional exercise in the treatment of patients with chronic mechanical low back pain.
Indian journal of physiotherapy.2015 volume 2, (2), 441-447.
14. Karina yukoabeet. al., acute effects of Maitland central poteroanterior mobilization on youth CLB Manual Therapy and Posturology and Rehabilitation journal 2015
15. Integrating- evidence into practice use of McKenzie base treatment for MLBP 2011 Journal of multidisciplinary health care 2011:4 393-402.
16. Casazza, B. A. Diagnosis and treatment of acute low back pain, American family physician 2012, 85(4), 343.
17. Kelly GA, Blake C, Power CK, O'keeffe D, Fullen BM. The association between chronic low back pain and sleep: a systematic review. Clin J Pain 2011, 27 (2): 169–81. http:// dx.doi.org/10.1002/j.1532-2149.2011.00092.
18. Manusov EG. Evaluation and diagnosis of low back pain. Prim. Care 2012,39 (3): 471–9. http://dx.doi. org/10.1016/j.pop.2012.06.003.
19. Chou, R; Fu, R, Carrino, JA, Deyo, RA. Imaging strategies for low-back pain: systematic review and meta- analysis. Lancet 2009, 373 (9662): 463–72. http://dx.doi. org/10.1016/S0140-6736 (09)60172-0
20. Sprouse R. "Treatment: current treatment recommendations for acute and chronic un differentiated low back pain". Prim. Care 2012, 39 (3): 481–6.
21..MaryamRezaee et al., "Prevalence of low back pain among nurse: predisposing factors and role of work place violence"-2014 Nov, volume 19(4).
22. A O Akinpelu et al., "Prevalence of low back pain among adolescent students in nigerian urban community"-2013 volume-5, page no 1-2.
23.Yi Xiang J. Wang "Improve low back pain Prevalence in females than in males after menopause age: evidence based on synthetic literature review"- 2015 page no: 6(2)
24.S. Brent Brotzman, Kevin E. Wilk. Clinical Orthopaedic Rehabilitation.2nd edition; 2003.

25. Denise M Oleske et al. Risk factors for Recurrent Episodes of Work Related Low Back Disorders in an Industrial Population. Spine (Phila Pa 1976).2006 ;31(7):789-98.
26. Everett C Hills. Mechanical Low Back pain.e Medicine. June 28, 2006. 7. Derek Richard Smith.et.al. Musculoskeletal disorders among staff in South Korea's largest nursing home. Environ Health Prev Med. 2003; 8(1): 23–28.
27. Physical therapy web space..
28 Aditchiradejnant, janelatimer,christipherG.Maher and Nicholas stepkovitchdoes the choice of spinal level treated during poteroanterior mobilization affect treatment outcomes physiotherapy and practice sep 2002:18:165-173
29. Nwuga VC. Relative therapeutics efficacy of vertebral manipulation and conventional treatment in back pain management am J Phy Med 1982 dec;61 (6):273-8

ANNEXURE-I

PSG Institute of Medical Sciences & Research
Institutional Human Ethics Committee
Recognized by The Strategic Initiative for Developing Capacity in Ethical Review (SIDCER)
POST BOX NO. 1674, PEELAMEDU, COIMBATORE 641 004, TAMIL NADU, INDIA
Phone : 91 422 - 2598822, 2570170, Fax : 91 422 - 2594400, Email : ihec@psgimsr.ac.in

To
Mr M Manikandan / Mr S Parthiban
II Year MPT
Guides: Mr R Mahesh / Mrs Ashraf Y
PSG College of Physiotherapy
Coimbatore

Ref: Project No.17/125

Date: July 06, 2017

Dear Mr Manikandan / Mr Parthiban,

Institutional Human Ethics Committee, PSG IMS&R reviewed and discussed your application dated 05.04.2017 to conduct the research study entitled "*Comparing the effectiveness of maitland spinal mobilization versus mckenzie exercises with core stability exercise on pain, range of motion and functional activities in mechanical low back pain*" during the IHEC meeting held on 19.05.2017.

The following documents were reviewed and approved:

1. Project submission form
2. Study protocol (Version 1 dated 05.04.2017)
3. Informed consent forms (Version 1 dated 05.04.2017)
4. Data Collection Tool (Version 1 dated 05.04.2017)
5. Permission letter from concerned Head of Department
6. Current CVs of Principal investigator, Co-investigator
7. Budget

The following members of the Institutional Human Ethics Committee (IHEC) were present at the meeting held on 19.05.2017 at IHEC Secretariat, PSG IMS & R between 10.00 am and 11.00 am:

Sl. No.	Name of the Member of IHEC	Qualification	Area of Expertise	Gender	Affiliation to the Institution Yes/No	Present at the meeting Yes/No
1	Mr R Nandakumar (Chairperson, IHEC)	BA., BL	Legal Expert	Male	No	Yes
2	Dr. S. Bhuvaneshwari (Member-Secretary, IHEC)	MD	Clinical Pharmacology	Female	Yes	Yes
3	Dr S Shanthakumari	MD	Pathology, Ethicist	Female	Yes	Yes
4	Dr Sudha Ramalingam	MD	Epidemiologist, Ethicist Alt. member-Secretary	Female	Yes	Yes
5	Dr D Vijaya	M Sc., Ph D	Basic Medical Sciences (Biochemistry)	Female	Yes	Yes

The study is approved in its presented form. The decision was arrived at through consensus. Neither PI nor any of proposed study team members were present during the decision making of the IHEC. The IHEC functions in accordance with the ICH-GCP/ICMR/Schedule Y guidelines. The approval is valid until one year from the date of sanction. You may make a written request for renewal / extension of the validity, along with the submission of status report as decided by the IHEC.

PSG Institute of Medical Sciences & Research
Institutional Human Ethics Committee

Recognized by The Strategic Initiative for Developing Capacity in Ethical Review (SIDCER)
POST BOX NO. 1674, PEELAMEDU, COIMBATORE 641 004, TAMIL NADU, INDIA
Phone : 91 422 - 2598822, 2570170, Fax : 91 422 - 2594400, Email : ihec@psgimsr.ac.in

Following points must be noted:

1. IHEC should be informed of the date of initiation of the study
2. Status report of the study should be submitted to the IHEC every 12 months
3. PI and other investigators should co-operate fully with IHEC, who will monitor the trial from time to time
4. At the time of PI's retirement/intention to leave the institute, study responsibility should be transferred to a colleague after obtaining clearance from HOD, Status report, including accounts details should be submitted to IHEC and extramural sponsors
5. In case of any new information or any SAE, which could affect any study, must be informed to IHEC and sponsors. The PI should report SAEs occurred for IHEC approved studies within 7 days of the occurrence of the SAE. If the SAE is 'Death', the IHEC Secretariat will receive the SAE reporting form within 24 hours of the occurrence
6. In the event of any protocol amendments, IHEC must be informed and the amendments should be highlighted in clear terms as follows:
   a. The exact alteration/amendment should be specified and indicated where the amendment occurred in the original project. (Page no. Clause no. etc.)
   b. Alteration in the budgetary status should be clearly indicated and the revised budget form should be submitted
   c. If the amendments require a change in the consent form, the copy of revised Consent Form should be submitted to Ethics Committee for approval
   d. If the amendment demands a re-look at the toxicity or side effects to patients, the same should be documented
   e. If there are any amendments in the trial design, these must be incorporated in the protocol, and other study documents. These revised documents should be submitted for approval of the IHEC and only then can they be implemented
   f. Any deviation-Violation/waiver in the protocol must be informed to the IHEC within the stipulated period for review
7. Final report along with summary of findings and presentations/publications if any on closure of the study should be submitted to IHEC

Kindly note this approval is subject to ratification in the forthcoming full board review meeting of the IHEC.

Thanking You,

Yours Sincerely,

SECRETARY
PSG IMS&R
COIMBATORE-641004
INSTITUTIONAL HUMAN ETHICS COMMITTEE

Dr S Bhuvaneshwari
Member - Secretary
Institutional Human Ethics Committee

ANNEXURE-II

ASSESSMENT

Subject Number:

DEMOGRAPHICDATA:

Name: Date of admission:

Age: Date of assessment:

Gender: IP/OP Number:

Occupation: Contact number: Address:

SUBJECTIVE ASSESSMENT:

Chief complaints

Present medical history:

Past medical history:

Personal history:

PAINHISTORY:

Site:

Side:

Onset:

Duration:

Type:

Aggravating factors:

Relieving factors:

NPRS:(Numerical Pain Rating Scale)

OBJECTIVE ASSESSMENT:

ON OBSERVATION:

Body Built:

Attitude of Limbs:

Posture:

Muscle Wasting:

Deformity:

Gait:

Tropical Changes:

External Appliances:

ONPALPATION:

Muscle tone:

Tenderness:

Muscle spasm:

Warmth

Myofascial nodules:

ONEXAMINATION:

RANGE OF MOTION:

Movements	Inch Tape	
Lumbar flexion		
Lumbar extension		
Lumbar lateral flexion	Right:	Left:
Lumbar Rotation	Right	Left

HIP	**RIGHT(Degrees)**	**LEFT (Degrees)**
Flexion		
Extension		
Abduction		
Adduction		
Medial rotation		
Lateral rotation		
KNEE		
Flexion		
Extension		
ANKLE		
Dorsi flexion		
Plantar flexion		
Inversion		
Eversion		

MUSCLE POWER:

Lumbar region		
Lumbar flexors		
Lumbar extensors		
Lumbar lateral flexors	Right:	Left:
Lumbar rotators	Right	Left
HIP	**RIGHT**	**LEFT**
Flexors		
Extensors		
Abductors		
Adductors		
Medial rotators		
Lateral rotators		
KNEE		
Flexors		

Extensors		
ANKLE		
Dorsi flexors		
Plantar flexors		
Invertors		
Evertors		

SENSATION:

Superficial sensation:

Deep sensation:

REFLEX: (WEXLER'SGRADING):

REFLEX	**Right**	**Left**
Knee jerk(L4/L5)		
Ankle jerk(S1/S2)		

Muscle Girth(Inchtape)

AREA	**Right(inches)**	**Left(inches)**
Thigh		
Leg		

SPECIALTEST

SLR Test 1. To5:

SLUMP Test1To 3:

FUNCTIONAL ASSESSMENT:

Oswestry Low Back Pain Disability Questionnaire:

PROVISIONAL DIAGNOSIS:

PHYSIOTHERAPYMANAGEMENT:

OBJECTIVES:

TREATMENT PLAN:

A) Short term goal:

B)Long term goal:

TREATMENT GIVEN:

Date: Therapist's signature:

FOLLOWUP CHART

Name : Subject Number:

Age : Date of Assessment:

Gender : Date of follow up:

IP/OP Number:

Specific complaints:

RANGE OF MOTION

Movements	**Inch Tape**	
Lumbar flexion		
Lumbar extension		
Lumbar lateral flexion	Right:	Left:
Lumbar Rotation	Right	Left

TREATMENT PLAN:

Results	**Pre-test**	**Post-test**
Numerical Pain Rating Scale	/	/
Oswestry Disability Index	/	/
RANGE OFMOTION		
Lumbar flexion		
Lumbar extension		

Date: Therapist's Signature

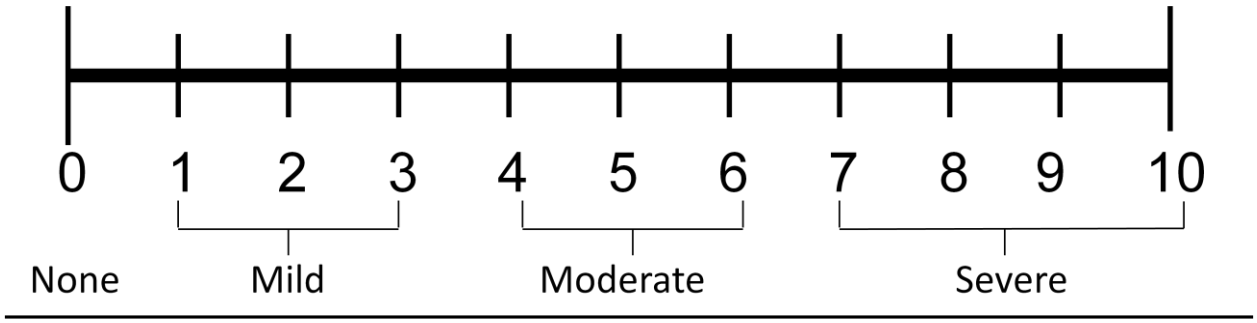
ANNEXURE-III

The Numeric Pain Rating Scale Instructions

General Information:

- The patient is asked to make three pain ratings, corresponding to current, best and worst pain experienced over the past 24hours.
- The average of the 3 ratings was used to represent the patient's level

Of pain over the previous 24 hour



Oswestry Low Back Pain Disability Questionnaire

Instructions

This questionnaire has been designed to give us information as to how your back or leg pain is affecting your ability to manage in everyday life. Please answer by checking ONE box in each section for the statement which best applies to you. We realize you may consider that two or more statements in any one section apply but please just shade out the spot that indicates the statement which most clearly describes your problem.

Section 1 – Pain intensity

- I have no pain at the moment
- The pain is very mild at the moment
- The pain is moderate at the moment
- The pain is fairly severe at the moment
- The pain is very severe at the moment
- The pain is the worst imaginable at the moment

Section 2 – Personal care (washing, dressing etc)

- I can look after myself normally without causing extra pain
- I can look after myself normally but it causes extra pain
- It is painful to look after myself and I am slow and careful
- I need some help but manage most of my personal care
- I need help every day in most aspects of self-care
- I do not get dressed, I wash with difficulty and stay in bed

Section 3 – Lifting

- I can lift heavy weights without extra pain
- I can lift heavy weights but it gives extra pain
- Pain prevents me from lifting heavy weights off the floor, but I can manage if they are conveniently placed eg. on a table
- Pain prevents me from lifting heavy weights, but I can manage light to medium weights if they are conveniently positioned
- I can lift very light weights
- I cannot lift or carry anything at all

Section 4 – Walking*

- Pain does not prevent me walking any distance
- Pain prevents me from walking more than
- Pain prevents me from walking more than 1
- Pain prevents me from walking more than
- I can only walk using a stick or crutches
- I am in bed most of the time

Section 5 – Sitting

- I can sit in any chair as long as I like
- I can only sit in my favorite chair as long as I like
- Pain prevents me sitting more than one hour
- Pain prevents me from sitting more than 30 minutes
- Pain prevents me from sitting more than 10 minutes
- Pain prevents me from sitting at all

Section 6 – Standing

- I can stand as long as I want without extra pain
- I can stand as long as I want but it gives me
- extra pain
- Pain prevents me from standing for more than
- 1 hour
- Pain prevents me from standing for more than
- 30 minutes
- Pain prevents me from standing for more than
- 10 minutes
- Pain prevents me from standing at all

Section 7 – Sleeping

- My sleep is never disturbed by pain
- My sleep is occasionally disturbed by pain
- Because of pain I have less than 6 hours sleep
- Because of pain I have less than 4 hours sleep
- Because of pain I have less than 2 hours sleep
- Pain prevents me from sleeping at all

Section 8 – Sex life (if applicable)

- My sex life is normal and causes no extra pain
- My sex life is normal but causes some extra pain
- My sex life is nearly normal but is very painful
- My sex life is severely restricted by pain
  My sex life is nearly absent because of pain
- Pain prevents any sex life at all

Section 9 – Social life

- My social life is normal and gives me no extra pain
- My social life is normal but increases the degree of pain
- Pain has no significant effect on my social life apart from limiting my more energetic interests eg, sport
- Pain has restricted my social life and I do not go out as often
- Pain has restricted my social life to my home
- I have no social life because of pain

Section 10 – Travelling

- I can travel anywhere without pain
- I can travel anywhere but it gives me extra pain
- Pain is bad but I manage journeys over two hours
- Pain restricts me to journeys of less than one hour
- Pain restricts me to short necessary journeys under 30 minutes
- Pain prevents me from travelling except to receive treatment

ANNEXURE-IV

PSG Institute of Medical Science and Research, Coimbatore

Institutional Human Ethics Committee

INFORMED CONSENT FORMAT FOR RESEARCH PROJECTS

We **Manikandan.M** and **Parthiban. S** carrying out a study on the topic: **"Comparing the effectiveness of Maitland spinal mobilization versus McKenzie exercise along with core stability exercise on pain, range of motion and functional activities in Mechanical Low Back Pain'',** as part of our research project being carried out under the aegis of the Department of Orthopaedics & Physical Medicine and Rehabilitation.

Our research guide is: Mrs. Ashraf. Y, Associate professor, PSG College of Physiotherapy.

The justification for this study is:

Mechanical Low Back Pain is a common condition of lumbar region that leads to pain and disability. Maitland spinal mobilization and McKenzie exercise with core stability exercise can reduce the pain and also improve range of motion and functional activities in Mechanical Low Back Pain.

The objectives of this study:

1. To determine the effects of Maitland spinal mobilization with core stability exercise on pain, range of motion and functional activities in subjects with mechanical low back pain.

2. To determine the effects of McKenzie exercise with core stability exercises on pain, range of motion and functional activities in subjects with mechanical low back pain.

3. To compare the effects of Maitland spinal mobilization versus McKenzie exercise with core stability exercise on pain, range of motion and functional activities in mechanical low back pain.

Sample size: **30**

Study participants are **Mechanical Low Back Pain patients,** age group of **20-40 years**.

Location: Department of Orthopaedics and Department of Physical Medicine and Rehabilitation PSG Hospitals, Comibatore.

We request you to kindly cooperate with us in this study. We propose to collect the background information and other relevant details related to this study. We will be carrying out:

Initial interview: 45-60 minutes.

Final interview: 45-60 minutes.

If **Photograph** taken, purpose: **yes,** without revealing the identity of yours we want to publish it in the project book, conferences and journals.

Data collected will be stored for a period of **2 years**. **We will not use** the data as part of another study.

Health education sessions: **Two** sessions each **45** minutes.

Clinical examination (specify details purpose): **Yes**

Blood sample collection: Not Applicable.

Specify quantity of blood being drawn**:** ml.

No. of times it will be collected:

Whether blood sample collection is part of routine procedure or for research (study) purpose: **NA**

1. Routine procedure 2. Research purpose

Specify purpose, discomfort likely to be felt and side effects, if any: **NA**

Whether blood sample collected will be stored after study period: Yes / No **/ NA**, it will be destroyed

Whether blood sample collected will be sold: Yes/ No **/ NA**

Whether blood sample collected will be shared with persons from another institution: Yes/ No **NA.**
Medication given, if any, duration, side effects, purpose, benefits:
Whether medication given is part of routine procedure: Yes / No **/NA.**
Whether alternatives are available for medication given: Yes / No /**NA.**
Benefits from this study:

- Mechanical Low Back Pain will be reduced.
- Range of motion will be improved.
- Functional activities will be improved.

Risks involved by participating in this study: There are minimal risks or discomforts will be experienced during this study. The discomforts are stretch pain and exercise induced pain that will be reduced by applying cryotherapy.
How the **results** will be used:

The data collected during the study will be used without revealing your identity. Your Identity will be confidential even if the results of the study are published in Peer-reviewed scientific journals, Conference presentation and internal report.
If you are uncomfortable in answering any of our questions during the course of the interview, **you have the right to withdraw from the interview / study at anytime.** You have the freedom to withdraw from the study at any point of time. Kindly be assured that your refusal to participate or withdrawal at any stage, if you so decide, will not result in any form of compromise or discrimination in the services offered nor would it attract any penalty. You will continue to have access to the regular services offered to a patient. You will **NOT** be paid any remuneration for the time you spend with us for this interview / study. The information provided by you will be kept in strict confidence. Under no circumstances shall we reveal the identity of the respondent or their families to anyone. The information that we collect shall be used for approved research purposes only. You will be informed about any significant new findings - including adverse events, if any, – whether directly related to you or to other participants of this study, developed during the course of this research which may relate to your willingness to continue participation.
Consent: The above information regarding the study, has been read by me/ read to me, and has been explained to me by the investigator/s. Having understood the same, I hereby give my consent to them to interview me. I am affixing my signature / left thumb impression to indicate my consent and willingness to participate in this study (i.e., willingly abide by the project requirements).
Signature / Left thumb impression of the Study Volunteer / Legal Representative:

Witness:

Signature of the Interviewer With date;
Contact number of PI: 7373463032
Contact number of Ethics Committee Office: 0422 4345818

ABSTRACT

BACKGROUND: Mechanical low back pain is the term that refers to a type of back pain caused by abnormal stress and strain on muscles, ligaments of the vertebral column. Mechanical back pain results from bad habits such as poor posture, poorly-designed seating and incorrect bending - lifting activities. Occurs most frequently in people between the age of 20 to 40 years. Both male and females population are affected. Pain is associated with the deconditioning of spine and trunk due to lack of core strength in which 60-8% general population suffering.

OBJECTIVES: To compare the effects of Maitland Spinal Mobilization versus McKenzie Exercise along with core stability exercise on pain, range of motion and functional activities in subjects with Mechanical Low Back Pain.

METHODS: Among 40 patients, 12 were excluded. The remaining 28 patients age group of 20 to 45years were recruited. The study was a quasi-experimental comparative design. This was

conducted at department of orthopaedics and department of physical medicine rehabilitation, PSG Hospitals, Coimbatore. By simple random sampling method 14 patients were selected in each group of intervention. Group A received Maitland Spinal Mobilization and Group B McKenzie Exercises. The core stability exercises were a common treatment for both groups. The treatment given for groups were 3 session/week for 2 weeks. The treatment outcome was assessed using Numerical Pain Rating Scale, Range of Motion, Oswestry Disability Index. Data were analyzed by SPSS 20 to determine the effects of both the treatment regimes and compared with each other.

RESULTS: Data analysis revealed statistically significant difference within group A analysis on pain pre and post mean values 7.571 and 2.5, SD value 0.916 t value is 20.696 ($p<0.001$).Range of Motion-lumbar flexion the Pre and Post test mean value 2.51and 5.428, SD value 0.662 ‘t’ value is 16.125 ($p< 0.001$).Range of Motion-lumbar extension the Pre and Post test mean value 1.428and 3,SD value 0.513 ‘t’value11.449 ($P<0$ 0.001)ODI Pre and Post-test mean value 44.428and 17.142SD value 8.061‘t’ value is12.664($P<0$ 0.001).

The Group B for the Pain Pre and Post test mean value 7.50 and 2.714, SD value 1.368 ‘t ’value is 13.082 ($p< 0.001$).Range of Motion- lumbar flexion Pre and Post test mean value 2.214 and 5.285SD value, 0.997 ‘t’ value is 11.524 ($p<0.001$).Range of Motion- lumbar extension Pre and Post test mean value 1.714and 3.428,SD value 0.468 ‘t’ value is 13.682($p< 0.001$).ODI Pre and Post-test mean value 41.571 and 15.571, SD value 5.922‘t’ values is 16.426 and ($p<0.001$)

But the between groups analysis is it showed insignificant changes in pain group A and B post test mean value 2.5 and 2.714 t value 0.822 ($p>0.001$).In between groups analysis is it showed insignificant changes in Range of Motion- lumbar flexion group A and B post test mean value 5.428and 5.285 t value 0.883 ($p>0.001$)In between groups analysis is it showed insignificant changes in Range of Motion- lumbar extension group A and B post test mean value3 and 3.428t value 0.002 ($p>0.001$)In between groups analysis is it showed insignificant changes in ODI group A and B post test mean value 17.142 and 15.571 t value 0.855 ($p>0.001$)

CONCLUSION: This study shows that Maitland Spinal Mobilization with Core stability exercises improves on functional activities in a greater level then McKenzie exercise with Core stability exercises on treating on mechanical low back pain patients.

KEYWORDS: Mechanical low back pain, Numerical pain rating scale, Range of motion Oswestry disability index Maitland Spinal Mobilization, McKenzie exercise, Core stability exercises,

பூ சா கோ மருத்துவக் கல்லூரி மற்றும் ஆராய்ச்சி நிறுவனம், கோவை

மனித நெறிமுறைக் குழு

ஒப்புதல் படிவம்

தேதி:

ம. மணிகண்டன் மற்றும் **ச. பார்த்தீபன்,** ஆகிய நாங்கள் பூ சா கோ மருத்துவக் கல்லூரியின் / மருத்துவமனையின் இயன்முறை மருத்துவத் துறையின் கீழ், **"ஒப்பீட்டுத்திறன் மூலமாக முறையற்ற செயல்பாட்டினால் ஏற்படும் கீழ் முதுகு வலியை (Mechanical Low Back Pain/Ache-MLBA) மெயிட்லெண்ட் முதுகுத்தண்டு நுண்ணசைவு (Maitland Spinal Mobilization) மற்றும் மெக்கன்சி பயிற்சி (Mckenzie Exercise) உடன் கூடிய வயிற்று தசை உறுதிப்படுத்தும் பயிற்சி (Core Stability Exercise) மூலம் வலியைக் (Pain) குறைத்து இயக்கவரம்பு (Range of Motion) மற்றும் அன்றாட செயல்திறனை (Functional activities) அதிகரித்தல்"** என்ற தலைப்பில் ஆய்வு மேற்கொள்ள உள்ளோம்.

எங்கள் ஆய்வு வழிகாட்டி: திருமதி. யா. அஷ்ரப், துணை பேராசிரியர், பூ.சா.கோ இயன்முறை மருத்துவக்கல்லூரி.

ஆய்வு மேற்கொள்வதற்கான அடிப்படை:

கீழ்முதுகுவலி (Mechanical Low Back Pain) என்பது முறையற்ற செயல்களினல் இடுப்புப் பகுதியில் ஏற்படுகிறது. இது வலியுடன் கூடிய இயலாமையைத் தருகிறது. மெயிட்லெண்ட் முதுகுத்தண்டு நுண்ணசைவு (Maitland Spinal Mobilization) மற்றும் மெக்கன்சி பயிற்சியுடனான (Mckenzie Exercise) வயிற்றுத்தசை உறுதிப்படுத்தும் பயிற்சி (Core Stability Exercise) மூலம் வலியை (Pain) குறைப்பதோடு இயக்கவரம்பை அதிகரித்து அன்றாட செயல்திறனையும் (Functional activities) அதிகரிக்கும் என எதிர்பார்க்கபடுகிறது. கீழ்முதுகுவலி உள்ளவர்களுக்கு மேற்கண்ட பயிற்சிகளைக் கொடுத்து அவர்களின் வலியைப் போக்கும் விதமாக ஆராய்ச்சி செய்ய உள்ளோம்.

ஆய்வின் நோக்கம்:

- முறையற்ற செயல்பாட்டினால் ஏற்படும் கீழ் முதுகு வலியை மெயிட்லெண்ட் முதுகுத்தண்டு நுண்ணசைவு (Maitland Spinal Mobilization) உடன் வயிற்றுத்தசை உறுதிப்படுத்தும் பயிற்சி (Core Stability Exercise) மூலம் வலியை குறைத்து, இயக்கவரம்பை அதிகரித்து அன்றாட செயல்திறனை அதிகரித்தல்.

- முறையற்ற செயல்பாட்டினால் ஏற்படும் கீழ்முதுகு வலியை மெக்கன்சி பயிற்சி (Mckenzie Exercise) மற்றும் வயிற்றுத்தசை உறுதிப்படுத்தும் பயிற்சி (Core Stability Exercise) மூலம் வலையை குறைத்து, இயக்கவரம்பை அதிகரித்து அன்றாட செயல்திறனை அதிகரித்தல்.
- முறையற்ற செயல்பாட்டினல் ஏற்படும் கீழ்முதுகு வலியை மெயிட்லெண்ட் முதுகுத்தண்டு நுண்ணசைவு (Maitland Spinal Mobilization) மற்றும் மெக்கன்சி பயிற்சி (Mckenzie Exercise) உடன் கூடிய வயிற்றுத்தசை உறுதிப்படுத்தும் பயிற்சி (Core Stability Exercise) மூலம் வலியை (Pain) குறைத்து இயக்கவரம்பு (Range of Motion) மற்றும் அன்றாட செயல்திறனை (Functional activities) அதிகரிப்பதில் எது மிகவும் உபயோகமான முறை என கண்டறிதல்.

ஆய்வில் பங்கு பெறும் நபர்களின் எண்ணிக்கை: 30

ஆய்வில் பங்கு பெறுவோர் மற்றும் வயது: 20 - 40 வயதுள்ள முறையற்ற செயல்பாட்டினால் **கீழ் முதுகு வலி (Mechanical Low Back Pain) உள்ளவர்கள்.**

ஆய்வு மேற்கொள்ளும் இடம்: எலும்பு முறிவு பிரிவு மற்றும் புணர்வாழ்வு மருத்துவத்துறைகள், பூ.சா.கோ மருத்துவமனை, கோயம்புத்தூர்.

ஆய்வு செய்யப்படும் முறை:

- இந்த ஆய்வின் மொத்த கால அளவு 6 முதல் 9 மாதங்கள். இந்த ஆய்வில் கீழ் முதுகு வலியினால் இயக்கவரம்பு குறைவாக உள்ள 30 நபர்களில் 15 பேர்களைக் கொண்ட இரு குழுக்களாகப் பிரித்துக்கொள்ளப்படும்.
- முதல் வருகையின்போது ஒவ்வொருவரின் கீழ்முதுகு வலியின் இயக்கவரம்பை மற்றும் அன்றாட செயல் திறனை அளவு நாடா (Inch Tape) என்ற கருவியின் உதவியுடன் அளவீடு எடுக்கப்படும். மேலும் NPRS எனப்படும் வலியை அளவிடும் கேள்விப் படிவம், ODI எனப்படும் கீழ்முதுகுவலியின் செயல்திறனை அளவிடும் படிவம் கொண்டு அளவீடு எடுக்கப்படும்..
- பின் ஆய்வில் ஈடுபடும் முதல் குழுவிற்கு மெயிட்லெண்ட் முதுகுத்தண்டு அணித்திரட்டல் மற்றும் வயிற்றுத்தசை உறுதிப்படுத்தும் பயிற்சிகளும், இரண்டாம் குழுவிற்கு மெக்கன்சி பயிற்சி மற்றும் வயிற்றுத்தசை உறுதிப்படுத்தும் பயிற்சியும் கொடுக்கப்படும்.
- இச்சிகிச்சை தொடர்ந்து ஒரு வாரத்திற்கு மூன்று முறை வீதம் இரண்டு வாரத்திற்கு அளிக்கப்படும். இரண்டு வார இறுதியில் மேற்கண்ட அளவீடுகள் மீண்டும் அளக்கப்படும்.
- பின்பு அதனை முதலில் எடுத்த அளவீடுகளுடன் ஒப்பிட்டு கீழ் முதுகு வலியின் இயக்கவரம்பு அதிகரித்துள்ளதா என ஆராயப்படும்.

முதன்மை நேர்காணல்: 45-60 நிமிடங்கள்
இந்த ஆய்வில் கிடைக்கும் தகவல்கள் **2 வருடங்கள்** பாதுகாக்கப்படும். இந்த தகவல்கள் வேறு ஆய்விற்குப் **பயன்படுத்தப்படமாட்டாது.**

சுகாதாரக் கல்வி: அமர்வுகள்: 2 முறை ஒரு அமர்வுக்கான நேரம்: **45** நிமிடங்கள்

மருத்துவ பரிசோதனைகள்: உண்டு

இரத்த மாதிரி சேகரிப்பு: இல்லை

இரத்த மாதிரி எடுப்பது வழக்கமான சிகிச்சைக்காகவோ அல்லது இந்த ஆய்விற்காகவோ:

பொருந்தாது

இதனால் ஏற்படக் கூடிய அசௌகரியங்கள் / பக்க விளைவுகள்: இதனால் எந்த அசௌகரியமோ, பக்க விளைவுகளோ ஏற்படாது. **பொருந்தாது**

இரத்த மாதிரிகள் ஆய்விற்குப் பின் பாதுகாத்து வைக்கப்படுமா? ஆம் / இல்லை, அழிக்கப்படும்: **பொருந்தாது**

சேகரிக்கப்பட்ட இரத்தம் விற்கப்படுமா? ஆம் / இல்லை **பொருந்தாது**

சேகரிக்கப்பட்ட இரத்தம் வேறு நிறுவனத்துடன் பகிர்ந்து கொள்ளப்படுமா? ஆம் / இல்லை: **பொருந்தாது**

மருந்துகள் ஏதேனும் கொடுக்கப்படவிருந்தால் அவை பற்றிய விவரம் (கொடுக்கப்படும் காரணம், காலம், பக்க விளைவுகள், பயன்கள்): **பொருந்தாது**

மருந்துகள் கொடுக்கப்படுவது வழக்கமான சிகிச்சை முறையா?: ஆம் / இல்லை (இல்லை என்றால் கொடுக்கப்படும் காரணம்) **பொருந்தாது**

கொடுக்கப்படும் மருந்துகளுக்கு மாற்று உள்ளதா?: ஆம் / இல்லை (ஆம் என்றால் இந்த குறிப்பிட்ட மருந்து கொடுக்கப்படும் காரணம்) **பொருந்தாது**

ஆய்வில் பங்குபெறுவதால் ஏற்படும் பலன்கள்:
இந்த ஆய்வில் பங்கு பெறுவதால், கீழ்முதுகு வலி குறைவதோடு மட்டுமல்லாமல் கீழ் முதுகு வலியின் இயக்கவரம்பு அதிகரித்து அன்றாட செயல்திறனும் அதிகரிக்கும் என எதிர்பார்க்கப்படுகிறது.

ஆய்வினால் பங்கேற்பதால் ஏற்படும் அசௌகரியங்கள் / பக்க விளைவுகள்: இந்த ஆய்வினால் தங்களுக்கு எந்த விதமான அபாயங்களும் அசௌகரியங்களும் ஏற்படாது. கீழ் முது வலி பயிற்சியினால் ஏதேனும் வலி ஏற்பட்டால் அதற்கு வெந்நீர் ஒத்தடம் கொடுக்கப்படும்.

ஆய்வின் முடிவுகள் எந்த முறையில் பயன்படுத்தப்படும்?

இந்த ஆய்வின் மூலம் கிடைக்கும் தகவல்கள் தங்களின் புகைப்படத்துடன் தங்களின் அடையாளம் அறியாவண்ணம் அகநிலை அறிக்கை (Internal report), கலந்தாய்வுகள் (Conference) அறிவியல் சார்ந்த ஆராய்ச்சிப் பத்திரிக்கைகளில் (Journals) வெளியிடப்படும். இதற்கு தங்களின் அனுமதி கோருகிறேன்.

இந்த ஆய்வின் கேள்விகளுக்கு பதிலளிப்பதோ, இரத்த மாதிரிகள் அல்லது திசு மாதிரிகள் எடுப்பதிலோ உங்களுக்கு ஏதேனும் அசௌகரியங்கள் இருந்தால், எந்த நேரத்தில் வேண்டுமானாலும் ஆய்விலிருந்து விலகிக்கொள்ளும் உரிமை உங்களுக்கு உண்டு. ஆய்விலிருந்து விலகிக்கொள்வதால் உங்களுக்கு அளிக்கப்படும் சிகிச்சை முறையில் எந்த வித பாதிப்பும் இருக்காது என்று உங்களுக்கு உறுதியளிக்கிறோம். மருத்துவமனையில் நோயாளிகளுக்கு அளிக்கப்படும் சேவைகளை நீங்கள் தொடர்ந்து பெறலாம். இந்த ஆய்வில் பங்கேற்க ஒப்புக்கொள்ளுவதால் வேறு எந்த விதமான கூடுதலான பலனும் உங்களுக்குக் கிடைக்காது. நீங்கள் அளிக்கும் தகவல்கள் இரகசியமாக வைக்கப்படும். ஆய்வில் பங்கேற்பவர்கள் பற்றியோ அவர்கள் குடும்பத்தைப் பற்றியோ எந்தத் தகவலும் எக்காரணம் கொண்டும் வெளியிடப்படாது என்று உறுதியளிக்கிறோம். நீங்கள் அளிக்கும் தகவல்கள் / இரத்த மாதிரிகள் / திசு மாதிரிகள் அங்கீகரிக்கப்பட்ட ஆய்விற்கு மட்டுமே பயன்படுத்தப்படும். இந்த ஆய்வு நடைபெறும் காலத்தில் குறிப்பிடத்தகுந்த புதிய கண்டுபிடிப்புகள் அல்லது பக்க விளைவுகள் ஏதும் ஏற்பட்டால் உங்களுக்குத் தெரிவிக்கப்படும். இதனால் ஆய்வில் தொடர்ந்து பங்கு பெறுவது பற்றிய உங்கள் நிலைப்பாட்டை நீங்கள் தெரிவிக்க ஏதுவாகும்.

ஆய்வுக்குட்படுபவரின் ஒப்புதல்: இந்த ஆய்வைப் பற்றிய மேற்கூறிய தகவல்களை நான் படித்து அறிந்து கொண்டேன் / ஆய்வாளர் படிக்கக் கேட்டுத் தெரிந்து கொண்டேன். ஆய்வினைப் பற்றி நன்றாகப் புரிந்து கொண்டு இந்த ஆய்வில் பங்கு பெற ஒப்புக்கொள்கிறேன். இந்த ஆய்வில் பங்கேற்பதற்கான எனது ஒப்புதலை கீழே கையொப்பமிட்டு / கை ரேகை பதித்து நான் தெரிவித்துக் கொள்கிறேன்.

பங்கேற்பாளரின் பெயர், முகவரி:

பங்கேற்பாளரின் கையொப்பம் / கை ரேகை / சட்டப்பூர்வ பிரதிநிதியின் கையொப்பம்:

தேதி :

ஆய்வாளரின் கையொப்பம்:

தேதி :

ஆய்வாளரின் தொலைபேசி எண்: 7373463032

மனித நெறிமுறைக் குழு அலுவலகத்தின் தொலைபேசி எண்: 0422 4345818

ANNEXURE-V

TREATMENT PROTOCOL

On first visit after getting consent form the Mechanical Low Back Pain (MLBP) individuals, the individual will be assessed with Numerical Pain Rating Scale, Low Back Pain Oswestry Disability Questionnaire and Range of Motion before the treatment. Each individual will receive treatment sessions (3sessions/week for2weeks). At the end of 6 treatment sessions the MLBP individual will be reassessed with Numerical Pain Rating Scale, Low back pain Oswestry Disability Questionnaire and Range of Motion to find out the results.

GROUP A

Maitland spinal mobilization will be performed 6-8 glides per session. Following the Maitland spinal mobilization techniques along core stability exercises, Home exercise program will be advised, which includes stretching exercises, strengthening exercises and postural correction. Total time of treatment of each session willbe45 minutes.

GROUP B

McKenzie exercises therapy will be performed for 10 repetitions. Following this core stability exercises will be given for 10 repetitions of 1minute each. Home exercises program will be advised, which includes stretching exercises, strengthening exercises and postural correction.Total timeof treatment of each session willbe45 minutes.

GROUP–A

MAITLAND SPINAL MOBOLIZATION COMBINED WITH CORESTABILITYEXERCISES

The manual therapy techniques will be chosen by the principal investigator according to the results of the biomechanical examination. The principal investigator will use any of the following manual therapy techniques applied at the spinal level of their choice according to the patient:

(centralposterior–anterior)CP

Technique:

Therapist stands to side of patient placing the irpisiform/ ulnar surface of hand over the selected spinous process (SP) with their wrist in full extension. Other hand placed on top of hand to reinforce.

Therapist's shoulders should be directly above the SP with elbows slightly bent.

METHOD:

Therapist uses their body weight to apply a Posterio-anterior force to the selected Spinous process by leaning their body over their arms and performing rocking movements to provide oscillatory movements of the vertebra. On initial assessment and treatment, if the patient has very limited movement, a pillow can be placed. Underneath their abdomen, or the head end of plinth can be raised to position the Lumbar spine in relative extension. Similarly, if the patient cannot tollerate pressure directly through the spinous process, the therapist can apply pressure either side of the SP with either thumb on the transverse processes (bilateral PA)Equally, as the patient's pain and stiffness reduces the position of the Patient can be altered to increase flexion nearer to end of range. This can be done by either lowering the foot section of the plinth or kneeling the patient on the floor by the foot of the plinth with his trunk flexed over the plinth (approx...20degreesflexion)

PA mobilization technique with lumbar flexion

GROUP–B

MCKENZIE EXERCISES THERAPY COMBINED WITH CORE STABILIY EXERCISES

1. Unilateral leg extension while upper body prone on couch:

The subjects were asked to keep the upper body prone on the couch and lift their legs alternately to the horizontal level and hold for 5seconds.

2**. Lifting hips up in bridged position**:

3. **Dead Bug exercise**:

In supine position, the patient was advised to flex ipsilateral upper limb and lower limb and hold the position for 10 seconds. Process was repeated for the opposite side. The movements must be done slowly.

4. **Superman exercise:**

The patients were asked to be in a 4 point kneeling position and Straighten out one leg behind, keeping the trunk still and no twisting. The process was repeated with other leg. The progression of this was done by lifting opposite arm and leg**.**

Procedure of McKenzie exercises:

The exercises were performed 3 series of 15 repetitions were done for each subjects, each exercise was performed with set of 30 times each. And then the exercises were performed in the next progressions once the present exercise is performed successfully.

1. Extension in prone lying:

Patient was asked to lay prone with arms beside the body and head turned to one side and maintain the position for 4-5minutes



Prone-lying Elbow press Press-ups

2. Extension in standing:

The patient was asked to stand upright with feet slightly apart, hands placed at the back so that the fingers are pointed backward and the thumbs forward. The patient bends backward at the waist as far as they can keeping the knees straight, maintaining this position for a second or two and return to the starting position.

3. Flexion in supine lying:

The patient was asked to lay supine with knees bent and foot placed on the couch. From this position the patient brings both the knees towards the chest and gently but firmly pulls the knees with hands towards the chest till pain permits. The patient maintains this position for 1-2 seconds and returns to starting position.

4. Flexion in sitting:

Patient seat on the edge of a chair with knees and feet well apart and Hands resting in between legs. From this position the patient bends forward and returns back.

Purpose: Decrease tension and pressure over your low back area

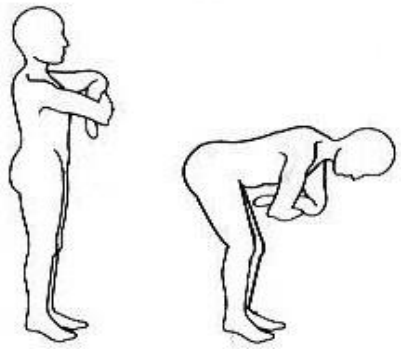
MECHANICAL LOW BACK PAIN

Name: ..... Age: ..... IP/OP No. : .....

GOOD MORNING

Stand with your feet slightly apart and arms folded in front of your chest Bend your knees a little and bend your hips to get your back flat and parallel to the ground while sticking your bottom out

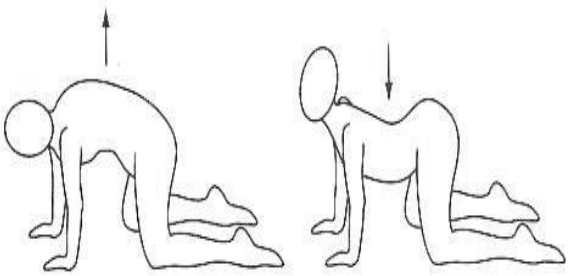
Breathe out on the way down, in on the way up



CAT AND CAMEL POSE

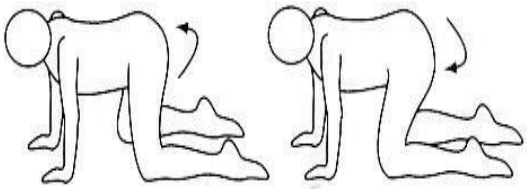
Arch the back, at the same time, look down at the floor. Then lower the stomach towards the floor, hollowing the back while looking up (If you are pregnant you should not do the second part of this exercise instead keep your back straight

Repeat 10 times.



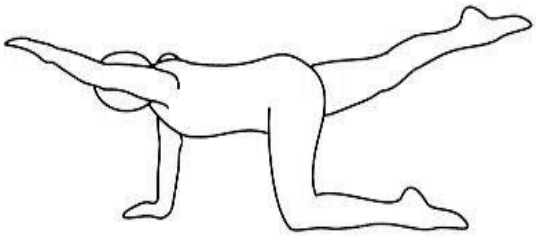
BENT LEG SIDE RAISES

Position yourself on the floor on all fours. Swing your bent leg out to the side from your hip then return it the middle. Repeat 10 times and do the same with the other leg.



ARM AND LEG EXTENSION

In an all fours position stretch one arm forward in front, while stretching the opposite leg out behind. Return your arm and leg to original position. Repeat 10 times and do the same with the other leg.

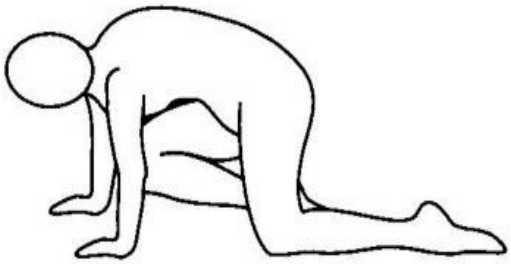


BACK ARCH

Lying face down on the floor, push up with your arms your hands placed below your Shoulders. Keep your pelvis on the floor and only raise your back. Repeat 10 times.

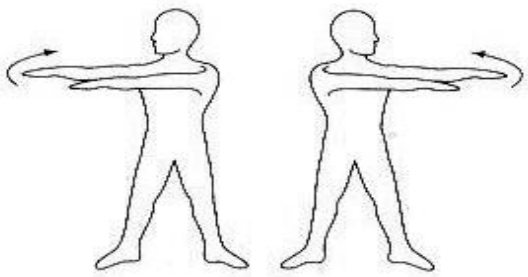
KNEE RAISES

While in the all fours position draw alternate knees to the opposite elbow. Return to the original position. Repeat 10 times and do the same with the other leg.



HEAD, ARMS AND TRUNK ROTATION

Start with feet hip width apart, hands and arms reaching directly forward at shoulder level. Turn your head, arms and shoulders around to the left as far as you can go, bending the right arm across the chest, keeping your hips still. Repeat to the right. Repeat 10 times.



DOES AND DONT'S

Incorrect

Correct

If pain worsens, stop the exercise

Date: .....

.....

Therapist Signature

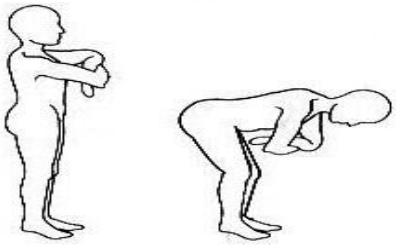
முதுகு வலிக்கான நிவாரண பயிற்சிகள்

பெயர்: ..... வயது: ..... பதிவு எண்: .....

பயிற்சிகாலம்: 10 - 20 முறை திரும்பச் செய்தல் / 2 அமர்வுகள் / நாள்

<u>காலை வணக்கப் பயிற்சி</u>

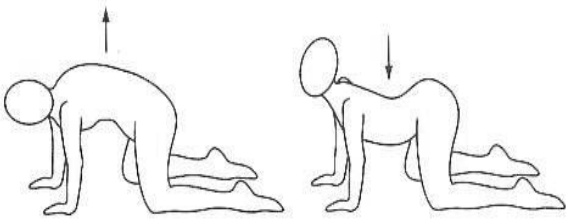
படத்தில் உள்ளது போல நேராக நின்று கொண்டு இரு கைகளையும் மடக்கி மார்பு அளவுக்கு நீட்டவும். பின்பு உங்கள் முழங்காலை சிறிது மடக்கி வைத்துக் கொண்டு முதுகை முன்புறமாக பாதி வளைத்து நிற்கவும்.



<u>பூனை மற்றும் ஒட்டகம் போன்று முதுகை வளைத்து செய்யும் பயிற்சி.</u>

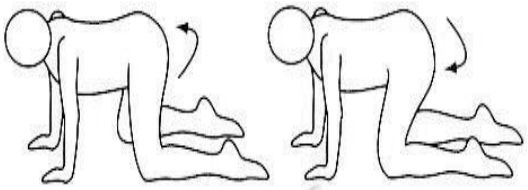
படத்தில் உள்ளது போல முதுகை முதலில் மேலே கொண்டு செல்லவும், அதே சமயம் தலைஅயை கீழே கொண்டு செல்லுதல். 10 எண்ணுகிற வரையில் அப்படியே இருக்கவும் பின் துவக்க நிலைக்கு வாருங்கள்.

பின் முதுகை கீழே கொண்டு தலையை மேலே தூக்கவும்.



<u>முழங்கால் மற்றும் கைகளால் மண்டியிட்டு காலை உள் மற்றும் வெளிப்புறமாக அசைக்கும் பயிற்சி.</u>

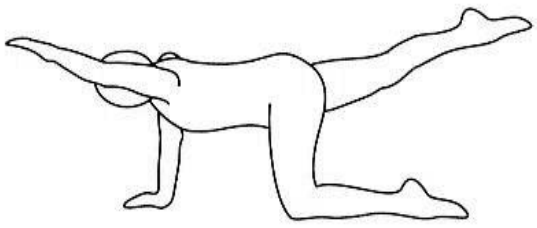
படத்தில் உள்ளது போல உங்கள் வலது காலை முதலில் மடித்துக் கொண்டு வெளிப்புறம் மற்றும் உட்புறமாக அசைத்தல் வேண்டும். பின்பு இடதுகாலை உள் மற்றும் வெளிப்புறமாக 10 முறை அசைக்க வேண்டும்.



<u>இரு கை மற்றும் கால்களை மண்டியிட்டு முதுகை நேராக வைத்து வலது கை மற்றும் இடது காலை நீட்டும் பயிற்சி.</u>

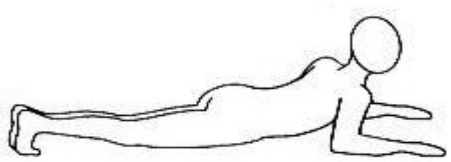
படத்தில் உள்ளது போல இரு கைகள் மற்றும் கால்களில் நின்று கொண்டு முதுகை நேராக வைத்து வலது கை மற்றும் இடது காலை ஒரே நேரத்தில் நீட்டவும். அதே 10 என்னுகிற வரையில் அப்படியே இருக்கவும்.

பின்பு இடது கை மற்றும் வலது காலை ஒரே நேரத்தில் நீட்டவும்.



<u>முதுகை வளைத்து செய்யும் பயிற்சி</u>

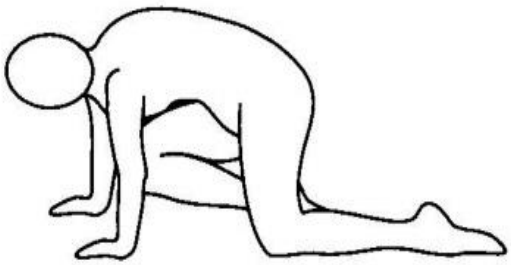
படத்தில் உள்ளது போல குப்புறபடுத்துக் கொண்டு இரு கைகளையும் தோள்பட்டைக்கு நேராக முழங்கைகளை மடக்கி வைத்துக்கொண்டு இடுப்புப்பகுதி தரையில் இருந்தவாறு தலை, முன்புறம் முதுகுதண்டை மட்டும் உயர்த்தல் வேண்டும். 10 என்னுகிற வரையில் அப்படியே இருக்கவும்.



<u>முழங்கால் கை மண்டியிட்டு காலை முன் மற்றும் பின்புறமாக அசைக்கும் பயிற்சி</u>

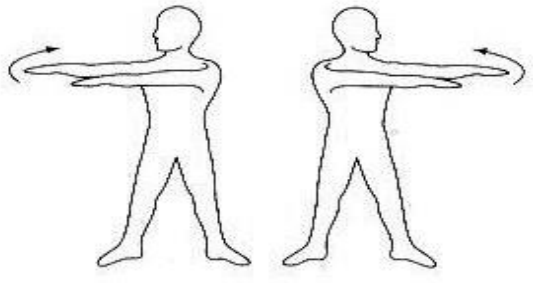
படத்தில் உள்ளது போல இரு கை மற்றும் கால்களை மண்டியிட்டு முதலில் வலது முழங்காலை மடித்த நிலையில் முன்னும் பின்னும் அசைக்க வேண்டும்.

இப்பயிற்சியை இடதுபுறம் 10 முறை செய்தல் வேண்டும்.

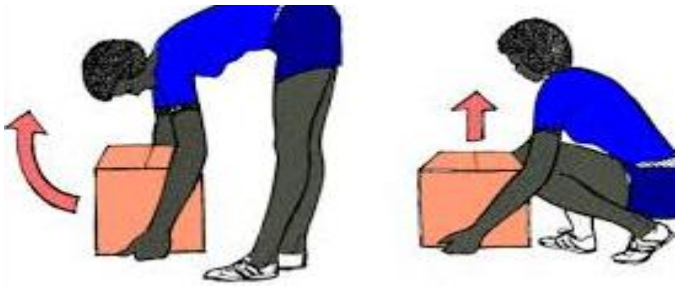


<u>தலை, கைகள் மற்றும் முதுகை சுழற்றி செய்யும் பயிற்சி.</u>

படத்தில் உள்ளவாறு நேராக நின்று கொண்டு தலை கைகள் மற்றும் முதுகை வலதுபுறமாக சுழற்றவும். 10 எண்ணுகிற வரையில் அப்படியே இருக்கவும். அதே போல் இடதுபுறமாக சுழற்றவும்.



செய்தல் மற்றும் செய்யக்கூடாதவை



தவறு **சரி**

வலி அதிகமானலோ அல்லது தலைவலி, தலச்சுற்றல் இருந்தாலோ பயிற்சிகளை செய்யக்கூடாது

தேதி: .....

.....

மருத்துவரின் கையொப்பம்